Chapter One
INVENTORY

Chapter One

Inventory

The initial step in preparation of the Airport Master Plan for San Manuel Airport (E77) is the collection and analysis of pertinent information, including an inventory of existing conditions at San Manuel Airport. Other essential data have been gathered that place the community of San Manuel and the airport, not only geographically, but also within the context of local and regional needs and demands. The inventory will provide a framework for all subsequent evaluations and proposed actions. This compilation of material includes the following:

- Airport setting, including locale, history, jurisdiction, climate, other airports, and previous studies.
- Physical inventories and descriptions of facilities and services now provided by the airport.
- An overview of existing regional plans and studies to determine their potential influence on the airport master plan.
- Background information pertaining to the community of San Manuel, the south-central Arizona region, and Pinal and Pima Counties. Analysis of these areas also includes descriptions of recent development which has taken place in the airport environs and plans for future development which may impact the airport.
- Population and socioeconomic information which provide an indication of the market and possible future development potential.

This information has been obtained through on-site investigations of the airport and interviews with airport management, airport tenants, and representatives of various government agencies. Information was also made available through studies concerning the airport, including: the *San Manuel Airport Master Plan* (1991), airport statistical data provided by Pinal County, and the May 2000 *Arizona State Aviation Needs Study* (SANS). Community informational reports and documents were utilized, as well as various internet web pages.

AIRPORT SETTING

The following discussion describes the physical location and historical background of San Manuel Airport. It also places it within the contexts of the national and state airspace systems.

LOCATION

As shown on **Exhibit 1A**, San Manuel Airport is located at the southeastern corner of Pinal County in south-central Arizona, two miles west of the unincorporated community of San Manuel. The airport is approximately 50 miles north of Tucson. The area is north of the Santa Catalina Mountain Range and just west of the San Pedro River and Galiuro Mountains in the eastern reaches of the Sonoran Desert. The natural scenic attractions of the area are the Santa Catalina Mountains, with Catalina State Park and Mount Lemmon Ski Valley; the new Oracle State Park (Oracle Center for Environmental Education) on the northeastern foothills of the mountain range, between Tucson and San Manuel; and several popular hiking trails, including the Oracle Ridge Trail and Arizona Trail. Major rail, freight, and bus terminals are located in Tucson.

San Manuel Airport is accessed by traveling east from Highway 77 on Highway 76, also called Redington Road. Prior to June 2003, when a new access road was constructed to Redington Road directly south of the airport, the airport was accessed via a 1.3 mile road on Broken Hills Properties (BHP Billiton) mining company of Australia property. The new road is less than one-mile long.

The airport sits at an elevation of 3,274 feet above mean sea level (MSL) on approximately 154 acres of land. The southern boundary of the airport is marked with a large storm water drainage channel. Further south is the BHP Billiton private rail line that runs to the copper mine and returns each day to the refinery and Redington Road. To the north and east is BHP Billiton-owned land. Arizona State Trust Land is located to the west.

The land surrounding the immediate airport boundaries is generally undeveloped. Surrounding land uses include an archery range and the copper smelter and refinery approximately two miles to the east.

To the north, the terrain declines towards the San Pedro River. To the west, the terrain drops off significantly as the Cottonwood Wash has worn a

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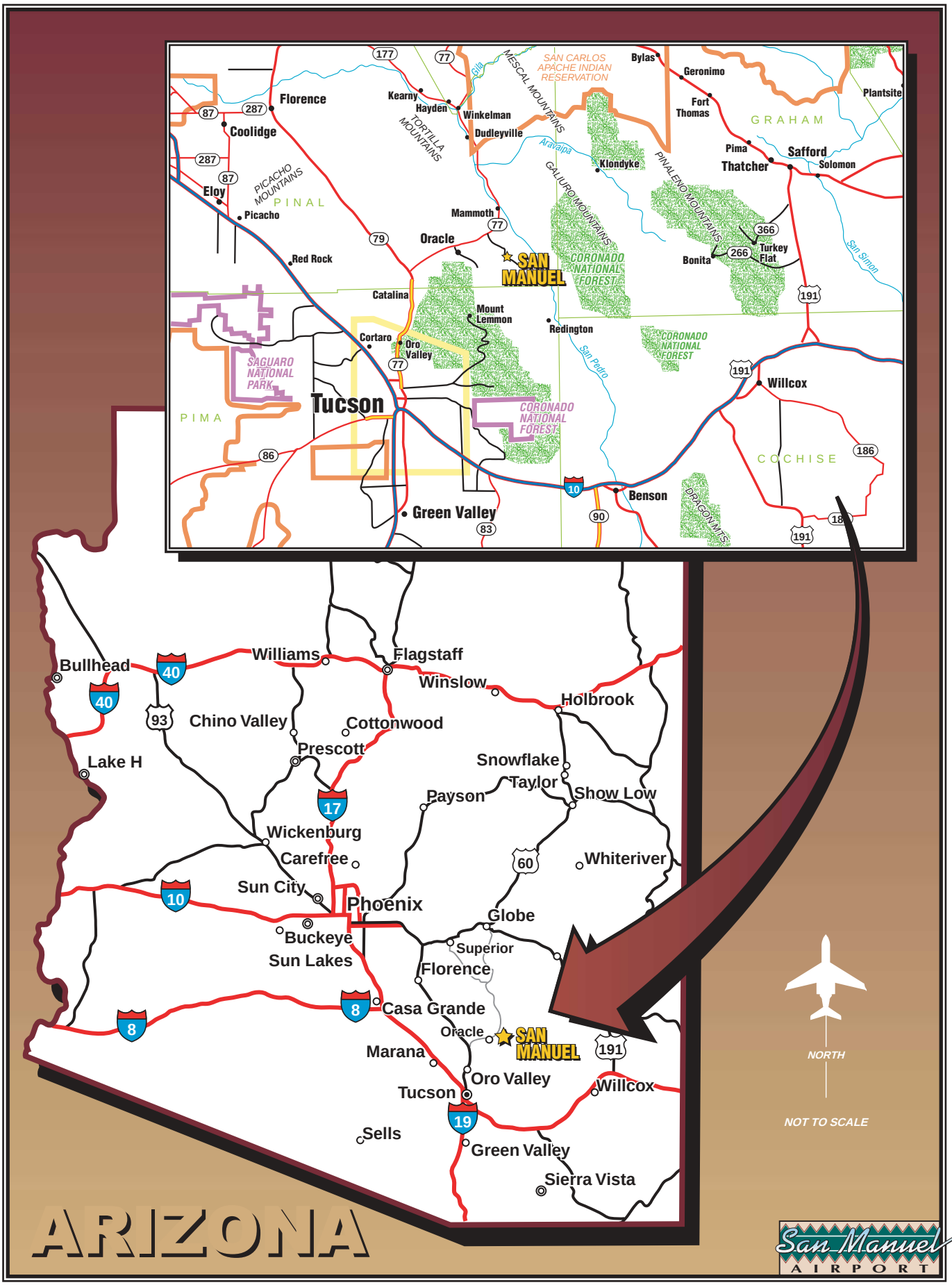

Exhibit 1A
VICINITY MAP

course from the north-facing hillsides down to the San Pedro River.

The airport property, which lies entirely within the unincorporated limits of Pinal County, is privately-owned by the BHP Billiton mining company and is leased to Pinal County for one dollar per year for 35 years, from 1995 to 2030. The county has appointed an airport manager, who oversees the operation of the airport. The airport has not established minimum standards.

The Pinal County Comprehensive Plan has designated the land surrounding the airport as either a public resource (Arizona State Trust owned land) or mining (BHP Billiton-owned land). The land surrounding the developed community of San Manuel is designated as either rural community, transitional, and rural. These land designations provide for the further commercial and residential development of the San Manuel community. Pinal County has not designated an Airport Disclosure Map for San Manuel Airport.

HISTORICAL AIRPORT DEVELOPMENT

In 1944, Magma Copper Company purchased existing mining claims in the area and began the period of exploration and manufacturing that resulted in the formation of the mine, mill, and smelter. Because of the isolated location, workers had to be brought in from outside the area. This led to the establishment of the town of San Manuel. Starting in 1953, company houses were constructed for the workers. The town was named for the old mine claim, San Manuel, after the patron saint of one of the early prospectors. Today the town is 95 percent privately-owned.

In 1953, Pinal County constructed San Manuel Airport as a 4,200-foot unpaved gravel airstrip for public use. The airstrip was used predominantly by mine contractors and visitors. In 1960, Pinal County made the first of four runway surface improvements, applying a two-inch asphalt overlay. In 1983, a slurry seal was completed, followed by a sand seal and crack repair in 1985. The most recent improvement resurfaced the entire runway while widening it to 75 feet, closing the airport from April to November 2000.

In 1967, a formal agreement was achieved between Pinal County and Magma Copper Company for lease of approximately 54 acres of land for a period of 20 years. In 1983, this lease was extended to the year 2010. In 1995, the Pinal County Board of Supervisors renegotiated the lease in favor of the existing 35-year lease agreement with Magma Copper Company to include airport development rights and a revision to the dissolution clause. The change in the clause means that rather than either party having rights to dissolution of the contract with a 30-day notice, the lessee (Pinal County) is solely able to dissolve the agreement (except upon expiration). Without this revision to the contract, the state could not expend improvement funds to improve a secondary-status airport that could conceivably revert to a private airfield at anytime. Currently, the owners of the

existing hangars pay a ground lease to the county.

PREVIOUS MASTER PLAN

The *San Manuel Airport Master Plan Update* (July 1991) proposed several improvements at the airport as follows:

- Acquire state land for Runway 11 runway protection zone (RPZ);
- Reconstruct and widen Runway 11-29;
- Drainage study and improvements;
- Pave airport entrance road;
- Grade and pave access road to new terminal;
- Construct terminal apron and taxiway access;
- Extend utilities;
- Install perimeter fencing;
- Construct fuel storage area and install vaulted storage tank;
- Install PAPI lights;
- Install electrical conduit for PAPIs;
- Grade perimeter road;
- Construct partial parallel taxiway;
- Construct a general aviation terminal building;
- Install an extra (Jet A) fuel tank at fuel island;
- Construct and pave general aviation parking;
- Remove old hangars and terminal building;
- Construct taxilanes; and
- Construct a 10-unit shade hangar.

In partial fulfillment of the master plan recommendations, some of the improvements have been made, including:

- Runway reconstruction;
- Partial taxiway construction;
- Apron construction;
- Security fencing;
- Conduit for eventual electrical (lighting and navigational aid) improvements; and
- Drainage channelization.

CLIMATE

Weather is a critical factor in airport planning and operations. Temperatures determine the length of runway needed for departure. Wind speed and direction determine runway alignment and use. Precipitation affects runway conditions. Cloud cover percentages and frequency of other climatic conditions affect visibility and the need

for, or use of, instrument approaches and airfield lighting. The location of San Manuel in arid south-central Arizona dictates much of the existing weather conditions.

According to the Western Regional Climate Center, the average daily minimum temperature ranges from 34 degrees Fahrenheit in January to 69 degrees Fahrenheit in July. The average daily maximum temperature ranges from 60 degrees Fahrenheit in January to 97 degrees Fahrenheit in July. The San Manuel area averages 14 inches of precipitation annually, with 3.2 inches of snow. The regional area averages sunshine 85 percent of the time, or approximately 310 days of the year. Wind patterns for the area indicate that wind flow is typically from the west/southwest. Weather data specific to San Manuel Airport is not gathered due to the lack of a weather collection device. This supports the installation of an Automated Weather Observation System (AWOS) at the airport.

AREA AIRPORTS

There are a number of nearby public and private airports providing various degrees of service within the operating vicinity of San Manuel Airport, as indicated on **Exhibit 1B**. Information is provided in **Table 1A** for those public airfields within a 40-nautical mile (nm) radius of San Manuel Airport. Although private, information is included for La Cholla Airport as the area that this airport serves may overlap with that of San Manuel. The following information is found in the table: associated city, nautical air miles from San Manuel Airport, length of longest runway, availability of an instrument approach, and the number of based aircraft.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS (NPIAS)

San Manuel Airport is not designated within the FAA's *National Plan of Integrated Airport Systems* (NPIAS). Typically, to be eligible for inclusion within the NPIAS, a general aviation airport must have at least 10 based aircraft and be located 20 miles from the nearest NPIAS airport. San Manuel has not historically met this minimum criterion; therefore, it has not been included in the NPIAS. Having now met these requirements, the County has applied for inclusion in the NPIAS. As of early summer 2003 a formal decision had not been made. The next NPIAS is scheduled to be published in 2005.

Inclusion within the NPIAS allows the airport to be eligible for Airport Improvement Program (AIP) funding. According to the NPIAS, of the 3,364 airports across the country in the NPIAS, 2,558 are classified as general aviation. General aviation accounts for the bulk of civil aircraft operations. It includes all facets of aviation except for commercial and military operations.

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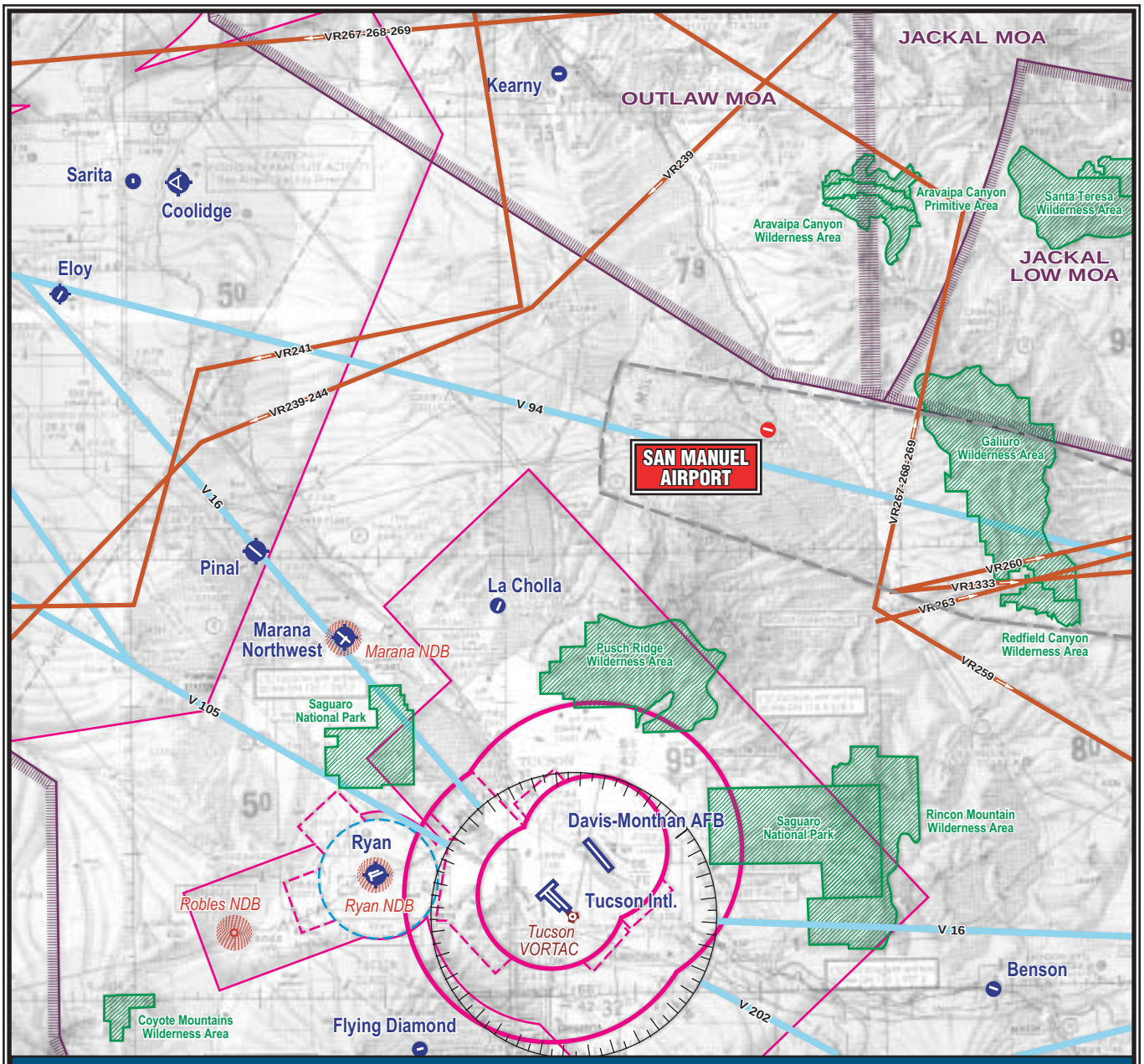

LEGEND

- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VOR
- VORTAC
- Non-Directional Radiobeacon (NDB)
- VOR-DME
- Compass Rose
- Military Training Routes
- Victor Airways
- Class C Airspace
- Class D Airspace
- Class E Airspace with Floor 700 ft. or greater above surface
- Class E Airspace with Floor 1200 ft. or greater above surface
- Class E Airspace
- Class E Airspace with Floor other than 700 ft. above surface
- MOA - Military Operations Area
- Restricted Areas
- Wilderness Areas

Source: Phoenix Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration

San Manuel AIRPORT

Exhibit 1B
AREA AIRSPACE & REGIONAL AIRPORTS

TABLE 1A
Area Airports

Airport/City	Distance nm (from E77)	Longest Runway	Instrument Approach	Based Aircraft
San Manuel Airport/ San Manuel	**0**	**4,200'**	**NO**	**17***
Tucson International Airport/Tucson	35	10,996'	YES	416
Pinal Airpark Airport/Marana	35	6,850'	YES	3
Ryan Field Airport/Tucson	40	5,500'	NO	253
La Cholla (private)/Tucson	22	4,500	NO	93
Marana Northwest Regional Airport/Marana	32	6,901'	NO	218
Kearny Airport/Kearny	28	3,400	NO	10
Benson Municipal Airport/Benson	40	4,000'	NO	–
Cascabel Air Park/Tucson	25	2,750'	NO	3

Source: Airport Master Records (latest available information).
* Airport management count.

ARIZONA STATE AVIATION SYSTEM PLAN (ASASP)

The *Arizona State Aviation System Plan* (ASASP) is developed by the Arizona Department of Transportation (ADOT), Aeronautics Division to address state-wide airport facilities needs. The purpose of the SASP is to ensure that the state has an adequate and efficient system of airports to serve its aviation needs well into the 21st century. The SASP defines the specific role of each airport in the state's aviation system and establishes funding needs. Through the state's *Continuous Aviation System Planning Process (CASPP)*, the SASP is updated every five years. The most recent update to the SASP is the draft *2000 Arizona State Aviation Needs Study (SANS)*. The purpose of the SANS is to provide policy guidelines that promote and maintain a safe aviation system in the state, assess the state's airports' capital improvement needs, and identify resources and strategies to implement the plan. San Manuel Airport is one of 112 airports within the state's aviation system plan. The 2000 SANS included all public and private airports and heliports in Arizona which are open to the public, including American Indian and recreational airports.

AIRPORT FACILITIES

This section describes the existing facilities at San Manuel Airport. Facilities are presented as follows:

- Airside Facilities
- Landside Facilities

Airside facilities needed for the safe and efficient movement of aircraft include runways, taxiways, airfield lighting, and navigational aids. In most cases, airside facilities dictate the types and levels of aviation activity capable of operating at an airport. Landside facilities include terminal buildings, aircraft parking aprons, hangars, aviation-related businesses, and automobile access and parking.

AIRSIDE FACILITIES

An aerial view of the airside facilities at the airport is shown on **Exhibit 1C**. **Table 1B** summarizes key airside facility data for the airport, especially regarding runway and navigational information. A discussion on other key airside facilities is provided in the following paragraphs.

TABLE 1B
Airside Facilities Data
San Manuel Airport

	Runway 11-29
Runway Length (feet)	4,214
Runway Width (feet)	75
Runway Surface Material	Asphalt
Surface Treatment	None
Runway Load Bearing Strength (lbs.)	
Single Wheel Loading (SWL)	12,000
Runway Markings	Basic
Runway Lighting	None
Taxiway Lighting	None
Approach Lighting	None
Weather Aids	Windcone Segmented Circle
Navigational Aids	None

Sources: Airport Facility Directory, Southwest U.S.

Runways

The airport is served by Runway 11-29, oriented west to east. The runway, which is 4,214 feet long and 75 feet wide, is constructed of asphaltic-concrete. The strength of the runway is rated at 12,000 pounds for single wheel type landing gear (SWL).

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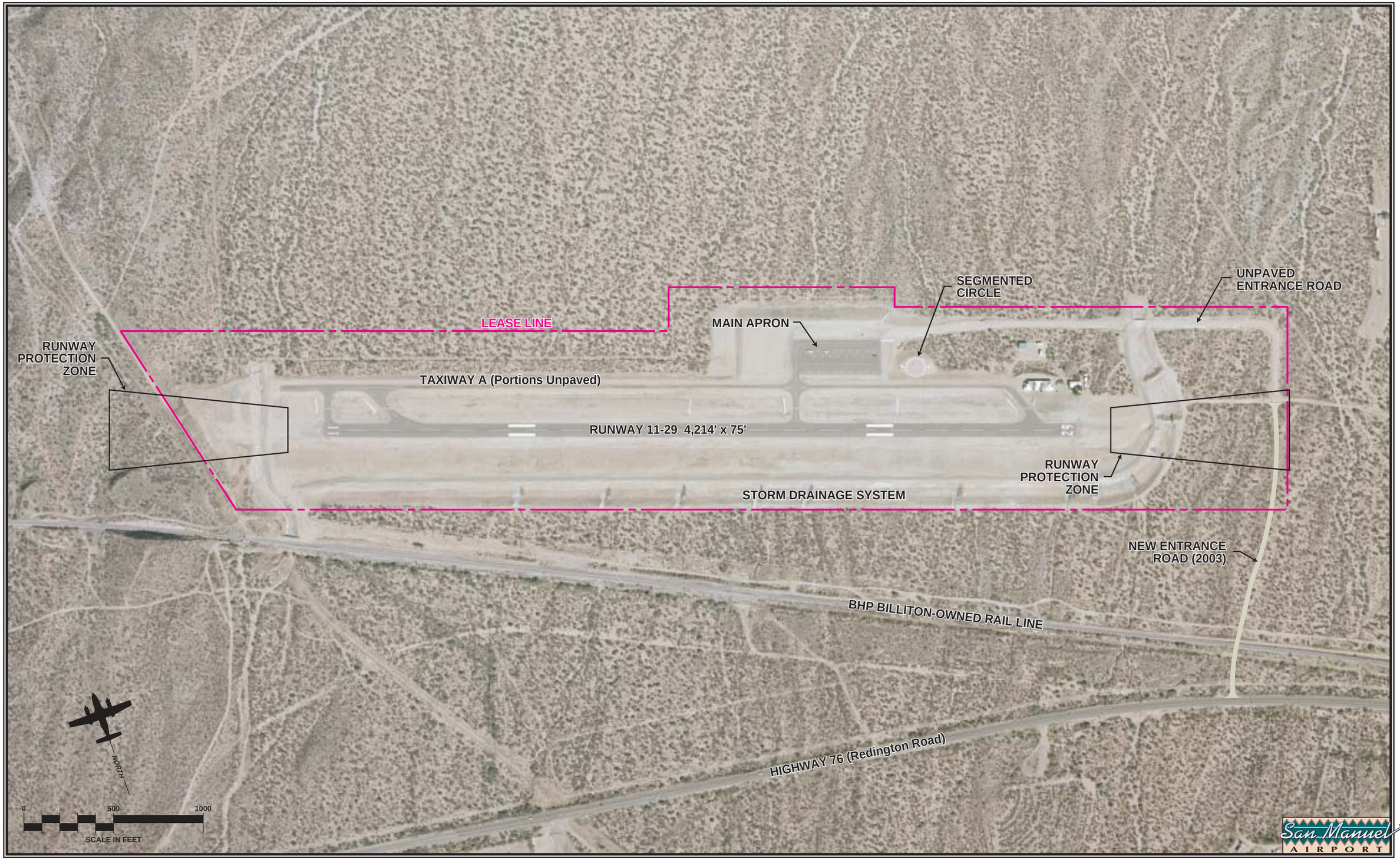

Exhibit 1C
EXISTING AIRFIELD FACILITIES

Taxiways

The airport is served by a parallel taxiway, portions of which are unpaved. The midfield taxiway and connection to the main apron, Runway 29 connecting taxiway, both connecting taxiways at the Runway 11 end and the portion of the parallel taxiway between them area paved. The remaining portions of the parallel taxiway is graded but not paved. The parallel taxiway has been set 240 feet from the runway centerline. All taxiways are 35 feet wide.

Pavement Markings

Pavement markings are used on runway and taxiway surfaces to identify a specific runway, runway threshold, centerline, hold line, or an edge line. Runways are marked with white markings in accordance with the type of approach available (e.g., visual, nonprecision, or precision) to each runway end.

The Runway 11-29 pavement markings at San Manuel are basic runway markings; that is, they identify the airfield to the extent of the needs for a visual approach only. These identify the runway designations, runway centerline, and touchdown point (two rectangular-shaped white stripes on each side of the runway centerline located 1,000 feet from the threshold).

Yellow taxiway and apron taxilane centerline markings are provided to assist way-finding and aircraft maneuvering on the ground. Aircraft hold lines and tiedowns are also marked with yellow paint.

Airfield Lighting

Airport lighting systems extend the capability of airport use into periods of darkness and/or poor visibility. Although not equipped with lighting systems, the electrical infrastructure has been installed at San Manuel Airport for this purpose. This infrastructure is intended to accommodate typical lighting systems, categorized by function and described in the following paragraphs.

Identification Lighting: The location of the airport at night is universally indicated by a rotating beacon. A rotating beacon displays flashes of alternating white and green light to identify a public airport. San Manuel Airport has no rotating beacon.

A lighted windcone and segmented circle are located on the north side of the runway, east of the main apron. This identification system allows visual confirmation of surface winds and runway traffic patterns, which is standard, or left traffic, for Runway 11 and nonstandard, or right traffic, for Runway 29.

Pavement Edge Lighting: Pavement edge lighting utilizes light fixtures placed near the pavement edge to define the lateral limits of the runway or taxiway. San Manuel Airport currently has no pavement edge lighting.

Runway End Identification Lighting: Runway end identifier lights (REILs) provide rapid and positive identification of the approach end of a runway. REILs are typically used on runways without more sophisticated

approach lighting systems. The REILs systems consist of two synchronized flashing lights located laterally on each side of the runway facing the approach aircraft. San Manuel Airport has no REILs.

Approach Lighting: Approach lighting is installed for the purpose of giving landing aircraft descent guidance to the end of the runway. Approach lighting can aid in both visual and instrument landings. Visual approach slope indicator lights (VASIs) and precision approach path indicator lights (PAPIs) provide this visual vertical guidance. San Manuel Airport has no approach lighting.

LANDSIDE FACILITIES

Landside facilities are those providing support to the operation of aircraft and are essential to the aircraft and pilot/ passenger handling functions. They typically consist of terminal buildings, ground services, aircraft parking apron, hangars, fuel service, and automobile parking. Landside facilities are outlined in the following section and are depicted on **Exhibit 1D**.

Terminal Facilities

The general aviation terminal facility is located on the north side of the airport, directly behind the fuel shed and to the right of the main hangars. The space is very basic, containing approximately 200 square feet of pilots' lounge and flight planning space. A restroom is attached to the building, but separately accessed. Although no marked stalls exist, vehicle parking spaces for five to six cars are available adjacent to the fuel pump.

Aircraft Apron Areas

There are two separate apron areas serving aircraft at San Manuel Airport. The east apron area, located north of the Runway 29 end, is 20,000 square feet in area and does not provide any tiedowns.

The main apron/tie-down area is located on the north of Runway 29 at approximately midfield. The apron was constructed in 2000. The main apron provides 26 tie-down positions and encompasses approximately 11,100 square yards.

Aircraft Hangar Facilities

Existing hangar facilities at San Manuel Airport are located on the north the runway, near the Runway 29 end. Existing hangar facilities include a T-hangar/shade hangar complex aligned parallel to the runway. This facility consists of a set of five enclosed individual T-hangars facing south that share a common rear wall with three shade hangars facing north. This facility encompasses approximately 7,300 square feet. To the north of these hangars, on an unpaved apron area, is a single 1,300 square-foot hangar. This area is also used for the storage of ultralight/experimental aircraft trailers.

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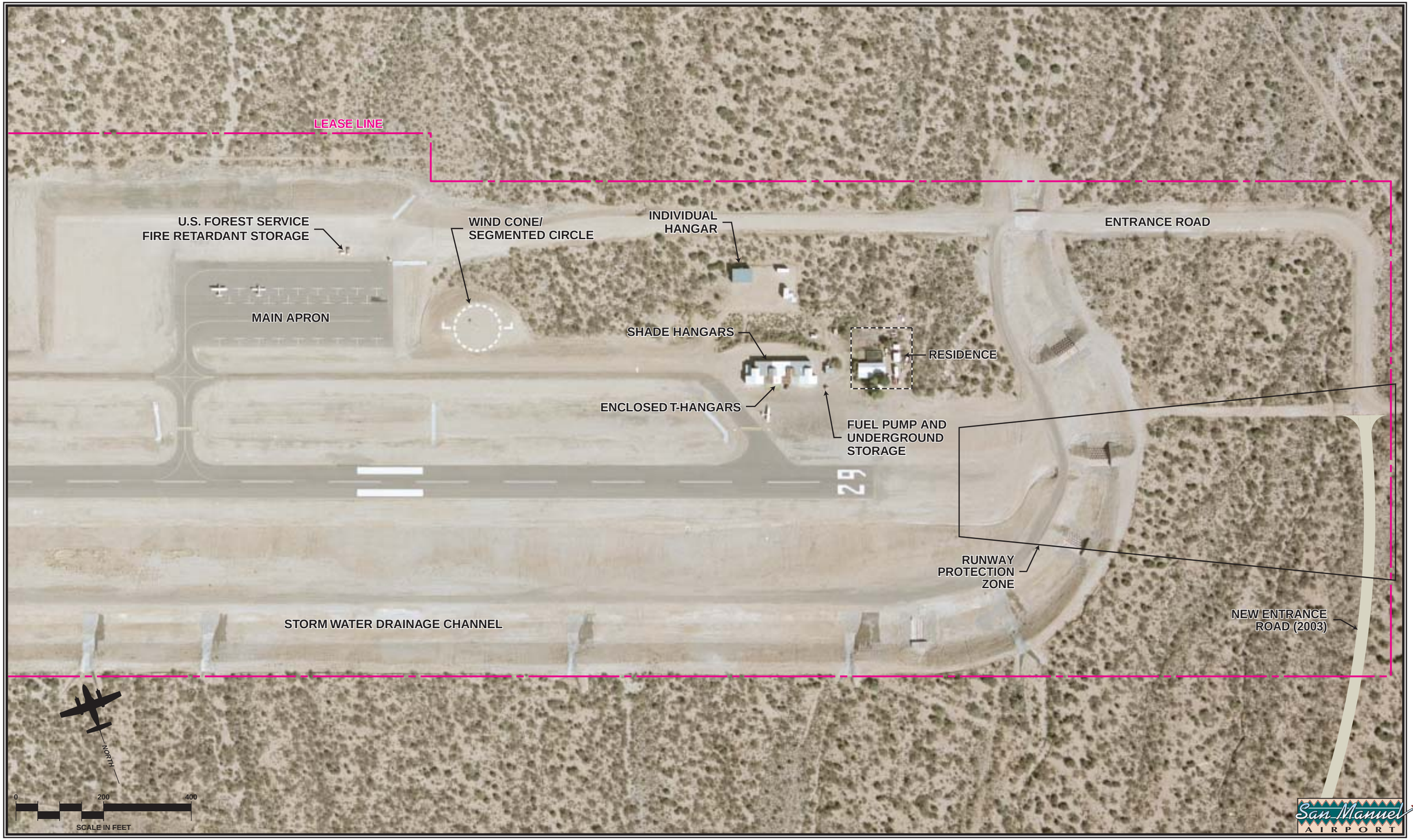

Exhibit 1D
EXISTING LANDSIDE FACILITIES

Fuel Facilities

San Manuel Airport has one above-ground fuel storage tank that is privately owned. The tank stores 2,000 gallons of 100 low-lead (LL) fuel. The self-serve pump is locked inside a utility shed adjacent to the main hangar area and the pilots' lounge.

Utilities

A critical element of land/airport facility development capability is the availability and quality of utility services. San Manuel Airport is served minimally by three utilities: water, electricity, and a septic system. A two-inch water line serves the airport from the main city line. The water is pumped uphill from the San Pedro River via two transmission lines to the 24-inch main line coming from the treatment plant located at the BHP Billiton mill. Electric service is provided by the Arizona Public Service Company (APS). The electric power is transmitted from the Oracle Substation to the San Manuel Substation. An underground distribution line runs from just south of the entrance road to a mobile home trailer. A single line feeds power from the trailer to the hangars. The trailer and pilots' lounge are hooked into an existing septic sewer system. Telephone service is provided only to the on-airport residence. Water service does not provide sufficient flow for fire protection.

Aircraft Rescue and Firefighting (ARFF)

There is no designated airport rescue and firefighting (ARFF) facility at San Manuel Airport. The local fire response system will respond to any emergencies at the airport. Equipment is located in San Manuel, approximately three miles east.

Fencing

The airport perimeter is marked with a barbed-wire fencing.

AREA AIRSPACE, NAVIGATIONAL AIDS, AND AIR TRAFFIC CONTROL

The FAA Act of 1958 established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS is defined as the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations and procedures; technical information; personnel and material. System components shared jointly with the military are also included.

AIRSPACE STRUCTURE

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure that regulates and establishes procedures for aircraft using the National Airspace System. The U.S. airspace structure provides for categories of airspace and identifies them as Classes A, B, C, D, E, and G.

Class A airspace is high-level controlled airspace and includes all airspace from 18,000 feet MSL to Flight Level 600 (approximately 60,000 feet MSL). Class B airspace is controlled airspace surrounding high activity commercial service airports such as Phoenix Sky Harbor International Airport. Class C airspace is controlled airspace surrounding lower activity commercial service and some military airports that are tower-controlled. Tucson International Airport is contained within Class C airspace. Class D airspace is controlled airspace surrounding low activity commercial service and general aviation airports with an airport traffic control tower (ATCT).

All aircraft operating within Classes A, B, C, and D airspace must be in constant contact with the air traffic control facility responsible for the particular airspace. Class E airspace is controlled airspace that encompasses all instrument approach procedures and low altitude federal airways. Only aircraft conducting instrument flights are required to be in contact with air traffic control when operating in Class E airspace. Class G airspace is uncontrolled airspace. Airspace in the vicinity of San Manuel Airport is depicted on **Exhibit 1B**, **Area Airspace**. The airport is located below a segment of transition airspace (Class E) and within Class G airspace.

Located north of the airport are areas of special-use airspace designated as military operations areas (MOAs). MOAs define airspace where a high level of military activity is conducted and are intended to segregate civil and military aircraft. While civilian aircraft operations are not restricted in the MOA, civilian aircraft are cautioned to be alert for military aircraft when the MOA is active and at the specified altitude. These MOAs include the Outlaw, Jackal, and Jackal Low MOAs.

The Gladden 1 MOA is located to the northwest of Wickenburg Municipal Airport. The Gladden 1 MOA is under the control of the Albuquerque Air Route Traffic Control Center (ARTCC) and military operations are authorized from 7,000 feet MSL, or 5,000 feet AGL, whichever is higher, with no upper limit. The Gladden 1 MOA is in effect Mondays through Fridays from 6:00 a.m. to 7:00 p.m.

While not considered part of the U.S. airspace structure, the boundaries of National Park Service Areas, U.S. Fish and Wildlife Service areas, and U.S. Forest Wilderness and Primitive areas are noted on aeronautical charts. While aircraft operations are not restricted over these areas, aircraft are requested to maintain a minimum altitude of 2,000 feet above the surface. **Exhibit 1B** depicts the boundaries of these areas near the airport.

Several military visual training routes are located in the vicinity fo the airport and shown on Exhibit 1B. These routes are used by military aircraft, which commonly operate at speeds in excess of 250 knots and at altitudes above 10,000 feet MSL. While civilian aircraft are not restricted in the vicinity of these routes, civilian aircraft are cautioned to remain alert for high speed military jet aircraft.

Aircraft enroute or departing San Manuel Airport may use very high frequency omnidirectional range (VOR) navigational facilities. The VOR or VORTAC facilities, depicted on **Exhibit 1B**, provide a system of Federal Airways, also referred to as Victor Airways. Victor Airways have been established to allow assured navigational capability along corridors of airspace eight miles wide and extending upward from 1,200 feet AGL to 18,000 feet MSL between VOR facilities. For further discussion of Victor Airways, refer to the following enroute navigational aids.

TERMINAL AREA AND ENROUTE NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies which are received by pilots of properly equipped aircraft. These transmissions are translated into point-to-point guidance and position information. The types of navigational aids available for aircraft flying between airports include: the very high frequency omnidirectional range (VOR) facility which can also be equipped with distance measuring equipment (DME); nondirectional radio beacon (NDB); and the global positioning system (GPS).

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, DME is combined with a VOR facility to provide distance as well as directional information to the pilot. In addition, military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. A VORTAC provides distance and direction information to civil and military pilots. VORs can be positively identified by a series of Morse Code transmissions that spell the three-letter identifier.

The several regional VOR facilities and their locations with respect to San Manuel Airport are listed below.

SAN SIMON (SSO) VORTAC is located 74 nautical air-miles east-southeast of San Manuel Airport. The signal may be intercepted on a radio frequency of 115.4 Megahertz, just three nautical air-miles south of San Manuel Airport.

TUCSON (TUC) VORTAC is located onfield at Tucson International Airport, 35 nautical air-miles southwest of San Manuel Airport. The signal is intercepted on a frequency of 114.0 Megahertz. There is no guaranteed Victor Airway from the VORTAC north and northeast due to the interference of the Santa Catalina Mountains.

STANFIELD (TFD) VORTAC is located 65 nautical air-miles west-

northwest of San Manuel Airport. The signal is intercepted on a frequency of 114.8 Megahertz.

As mentioned, San Manuel Airport is also situated just north of the V 94 Victor Airway. V 94 passes within several miles of the airport and allows guaranteed navigation from San Simon VORTAC to Stanfield VORTAC.

The NDB transmits nondirectional radio signals whereby the pilots of properly equipped aircraft can determine the bearing to or from the NDB facility and then "home" or track to or from the station. Although none are directly associated with San Manuel Airport, there are several Tucson vicinity airports served by NDBs.

NDB Name	Identifier	Heading/Distance (nm) to E77
Marana	AVQ	053/31.7
Ryan	RYN	029/39.6

GPS is an additional navigational aid for pilots enroute to the airport, as well as an instrument approach aid. GPS was initially developed by the United States Department of Defense for military navigation around the world. Increasingly over the last few years, GPS has been utilized to a greater extent in civilian aircraft. GPS uses satellites placed in orbit around the globe to transmit electronic signals which are used by properly equipped aircraft to determine altitude, speed, and navigational information. GPS allows pilots to directly navigate to any airport in the country, eliminating the need for a specific navigational facility.

The FAA is proceeding with a program to transition to GPS as the primary enroute navigational aids with GPS. Existing navigational aids will be retained for redundancy and safety. Currently, San Manuel Airport is not served by a GPS or other instrument approach.

Instrument Approach Procedures

When the visibility and cloud ceilings deteriorate to a point where visual flight can no longer be conducted, aircraft must follow published instrument approach procedures to locate and land at the airport. The different minimum requirements for visibility and cloud ceilings are varied, dependent on the approach speed of the aircraft. There is currently no designated instrument approach procedure for the airport.

Instrument Departure Procedures

Aircraft departing an airport using instrument flight rules are required to contact and receive instruction from the designated Departure Control facility. An aircraft would then fly assigned headings and altitudes. Ultimately, the aircraft is "handed off" to the Air Route Traffic Control Center (ARTCC) with authority over that flight sector. There are no designated instrument approach procedure for the airport.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)

The FAA has established 21 ARTCCs in the continental United States to control aircraft operating under IFR within controlled airspace on the enroute phase of flight. An ARTCC assigns specific routes and altitudes along federal airways to maintain separation and orderly air traffic flow. Centers use radio communication and long range radar with automatic tracking capability to provide enroute air traffic services. Typically, the ARTCC splits its airspace into sectors and assigns a controller, or team of controllers, to each sector. As an aircraft travels through the ARTCC, one "hands off" control to another. Each sector guides the aircraft using discrete radio frequencies. The Albuquerque ARTCC is responsible for the enroute control of all aircraft operating under IFR arriving and departing the local airspace.

LOCAL AIR TRAFFIC CONTROL

Although San Manuel Airport is not served by an Airport Traffic Control Tower (ATCT), pilots can broadcast their intention and position on the common traffic advisory frequency (CTAF) channel 122.9 Megahertz (MHz), also called UNICOM.

SOCIOECONOMIC CHARACTERISTICS

A variety of historical and forecast socioeconomic data related to San Manuel and Pinal and Pima Counties was collected for use in various elements of this master plan. This information is essential in determining aviation service level requirements, as well as forecasting the number of based aircraft and aircraft activity at the airport. Aviation forecasts are normally related to the population base, economic strength of the region, and the ability of the region to sustain a strong economic base over an extended period of time.

This section reviews population and economic information for areas that will relate to aircraft ownership and registration (existing and potential market) for San Manuel Airport. More than half of the ownerships of the existing based aircraft come from south of San Manuel, especially north Tucson. Therefore, it will be important to identify trends, not only in Pinal County and San Manuel, but also in the growth area south along Highway 77 in northern Pima County, especially the cities of Catalina (on the county line) and Oro Valley (on the fringe of north Tucson).

This section will investigate the most recent trends for the counties and, by reviewing local census growth trends, attempt to draw conclusions that will be pertinent to a potential market area for San Manuel Airport.

POPULATION

Airports are support facilities to the communities and regions that they serve. Therefore, the population and economic structure of the attending communities are critical factors to consider when planning airport

facilities. In this analysis, consideration will be given to the historical and forecast population for both Pinal County and Pima County. Pima County is included as much of the area population growth (and thereby potential San Manuel-based aircraft) is expected to continue to occur north of Tucson along the Highway 77 corridor within both counties.

Table 1C summarizes historical population data for the unincorporated San Manuel census designated place (CDP), Oro Valley, Mammoth, Catalina, Pinal County, and Pima County. As shown in the table, with the exception of Mammoth, the population in each of these areas has been growing at a steady pace since 1990. Oro Valley has grown the fastest, averaging an annual growth rate of 14.6 percent.

EMPLOYMENT

Analysis of a community's employment base can provide valuable insight to the overall well-being of the community. In most cases, the community make-up and health are significantly impacted by the availability of jobs, variety of employment opportunities, and types of wages provided by local employers.

TABLE 1C
POPULATION STATISTICS

	1990	2000	2001	2002	Avg. Annual Growth Rate
San Manuel CDP	4,009	4,375	4,574	4,683	1.3%
Catalina CDP	4,864	7,025	---	---	3.7% [1]
Oracle CDP	3,043	3,563	3703	3,814	1.6%
Mammoth	1,845	1,762	1,780	1,790	-0.3%
Oro Valley	6,670	29,700	32,520	34,050	14.6%
Pinal County	116,397	179,727	186,795	192,395	4.3%
Pima County	666,957	843,746	870,610	890,545	2.4%

Sources: Arizona Department of Commerce, Arizona Department of Economic Security
CDP - Census Designation Place
[1] Avg. Annual Growth Rate 1990 to 2000

Employment statistics for Pinal County and Pima County can be found in **Table 1D** and **Table 1E** below. According to information presented in CEDDS, 2001, by Woods and Poole Economics, Inc., Pinal County increased in total employment over the five-year reporting period by an average 1.57 percent annually. The rate of employment increased at a lower rate than the population over the same time period. The greatest sectors of growth have been: retail trade; finance, insurance, and real estate; and services industries, all achieving greater than three percent annual growth. Combined, these three employment sectors make up almost half of all jobs in Pinal County. Employment statistics for Pima County indicate that the growth in total employment averaged 2.12 percent for

the five-year period from 1995 to 2000. The growth in employment exceeded that for population for the same time period.

TABLE 1D
Employment by Sector
Pinal County

Pinal County	1995	1996	1997	1998	1999	2000	Percent Annual Increase
Total Employment	51,348	53,529	54,176	53,271	54,843	56,375	1.57%
Farm Employment	2,346	2,493	2,534	2,708	2,735	2,760	2.75%
Agricultural Services, Other	1,044	1,158	1,021	1,089	1,105	1,112	1.06%
Mining	4,810	5,509	5,470	4,724	4,792	4,861	0.18%
Construction	2,129	2,476	2,529	1,719	1,758	1,793	-2.82%
Manufacturing	4,131	3,413	3,194	3,080	3,066	3,053	-4.92%
Transport, Communications & Public Utilities	1,161	1,210	1,190	1,224	1,255	1,279	1.63%
Wholesale Trade	1,261	1,251	1,191	1,003	1,042	1,075	-2.62%
Retail Trade	7,706	7,942	8,137	8,578	8,890	9,220	3.03%
Finance, Insurance & Real Estate	1,844	2,021	2,186	2,323	2,433	2,520	5.34%
Services	10,834	12,213	13,287	13,241	13,813	14,408	4.87%
Federal Civilian Government	837	775	778	778	793	808	-0.59%
Federal Military Government	381	366	365	361	361	361	-0.89%
State and Local Government	12,864	12,702	12,294	12,443	12,791	13,125	0.34%

Source: Woods & Poole, Inc. (CEDDS, 2001)

A review of the various employment sectors shows that the Pima County area has a widely diversified economy. The growth sectors of employment that rose at annual rates of three percent or greater were: agricultural services; finance, insurance, and real estate; and services industries. Additionally, the statistics indicate that other sectors also rose steadily for the time period. The only negative growth sectors were in mining and government employment.

PER CAPITA PERSONAL INCOME

Table 1F, Per Capita Personal Income (PCPI), compares the per capita personal income (adjusted to 1996 dollars) for Pinal County, Pima

County, the State of Arizona, and the United States between 1995 and 2000.

As illustrated by the table, the two counties have mirrored, but slightly trailed the PCPI for the United States. The PCPI for Pinal County increased at the lowest rate of all, keeping the average per capita income below $20,000. The two Arizona counties were outperformed by the state overall, with a 2.4 percent average annual increase in income over the five-year period. This rate exceeded the United States average annual increase by several tenths-of-a-percent.

TABLE 1E
Employment by Sector
Pima County

Pima County	1995	1996	1997	1998	1999	2000	Percent Annual Increase
Total Employment	385,021	393,769	401,843	415,600	426,585	436,692	2.12%
Farm Employment	1,056	1,043	993	1,052	1,054	1,056	0.00%
Agricultural Services, Other	4,292	4,511	4,648	4,899	5,077	5,243	3.39%
Mining	2,792	2,825	2,875	2,698	2,705	2,713	-0.48%
Construction	24,360	24,427	24,717	25,526	25,399	25,235	0.59%
Manufacturing	29,863	30,178	30,533	31,162	31,401	31,640	0.97%
Transport, Communications & Public Utilities	15,260	15,433	16,056	16,128	16,734	17,236	2.05%
Wholesale Trade	11,362	11,683	11,976	12,125	12,635	13,092	2.39%
Retail Trade	68,637	68,827	70,316	71,375	72,337	73,278	1.10%
Finance, Insurance & Real Estate	26,827	28,927	29,240	31,410	31,904	32,299	3.14%
Services	129,439	134,380	138,455	146,715	153,902	160,541	3.65%
Federal Civilian Government	8,751	8,298	8,413	8,619	8,631	8,651	-0.19%
Federal Military Government	8,142	8,112	8,098	7,728	7,726	7,725	-0.87%
State and Local Government	54,240	55,125	55,523	56,163	57,080	57,983	1.12%

Source: Woods & Poole, Inc. (CEDDS, 2001)

TABLE 1F
Adjusted Per Capita Personal Income (PCPI)
County, State, and U.S.

Area	1995	1996	1997	1998	1999	2000	Average Annual Increase
Pinal County	$15,206	$15,361	$15,406	$15,462	$15,998	$16,117	0.97%
Pima County	$20,340	$20,845	$21,159	$22,055	$22,484	$22,864	1.97%
State of Arizona	$21,077	$21,611	$22,404	$23,493	$23,909	$24,298	2.40%
U.S.	$24,068	$24,651	$25,430	$26,402	$26,894	$27,323	2.14%

Source: Woods and Poole, Inc., CEDDS, 2001 - (Adjusted to 1996 Dollars)

SUMMARY

The information discussed on the previous pages provides a framework for the remaining elements of the Airport Master Planning process. Information on current airport facilities, their utilization, and conditions will serve as a basis, with additional analysis and data collection, for the development of forecasts of aviation activity and facility requirement determinations.

DOCUMENT SOURCES

A variety of different documents were referenced in the inventory process. The following listing reflects a partial compilation of these sources. An on-site inventory and interviews with city administrators were also used to review the conditions of facilities for the master planning effort.

Airport Facility Directory, Southwest U.S., U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

The Complete Economic and Demographic Data Source (CEDDS) Woods and Poole Economics, Inc. 2001.

San Manuel Airport Master Plan Update, 1991; Pinal County.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2001-2005.

Phoenix Sectional Aeronautical Chart, U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

Arizona State Airport System Plan (ASASP), Arizona Department of Transportation, Aeronautics Division.

The following Web pages were also visited for information during the preparation of the inventory:

FAA 5010 Data, Area Airports
http://www.airnav.com/
http://www.nasao.org/
http://www.gcr1.com/
http://www.faa.com/
Pima Association of Governments
http://www.pagenet.org
Pima County
http://www.co.pima.az.us
Pinal County
http://www.co.pinal.az.us
Tri-Community Chamber of Commerce
http://smortricommunity.com
United States Census
http://www.census.gov
San Manuel Chamber of Commerce, Economic Development, and Visitor Center